Can Development Impact Fees help Mitigate Urban Sprawl?

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The Research

- Albuquerque, New Mexico, USA
    - Impact Fee Design
    - Targeting Problems associated with Urban Sprawl
- Findings:
    - Impact fees linked to drop in construction
    - The Albuquerque program produced asymmetric effects across different locations, creating 2 distinct countervailing influences on patterns of Urban Sprawl.
    - Regional vs. Local effects

Development Impact Fees

- What are impact fees?

  – One time up-front fee levied on new development

  – Distinct categories (Transportation, Drainage, School, Park, Police, Fire, Utilities, etc.)

  – Must pass 'Rational Nexus Test'

  – Commonly Phased In over time and updated/expanded over time

  – Post-Recession occurances of roll-backs

  – *Can be designed as average-cost or marginal-cost*

 – *Can be implemented over small or large areas*

Urban Sprawl

- What exactly is urban sprawl?

  – Large physical city size

  – Low density (single family) construction

  – Difficulties of measuring sprawl

- Nagative Impacts of Sprawl

  – Traffic congestion & more accidents

  – Pollution & degraded air and water quality

  – Poor health outcomes

  – Higher cost of Public Services

Causes of Urban Sprawl?

- Multiple possibilities have been advanced
    - Live-work disparities....Job spatial mismatch
    - Fiscal Zoning (large lots vs. MF, small homes)
    - Externalities and unpriced resources (valuing open space, environmental benefits of compact growth)
- Impact Fees focus on pricing failures
    - Externality problem of infrastructure provision
    - Core residents subsidize fringe construction

Dealing with Urban Sprawl
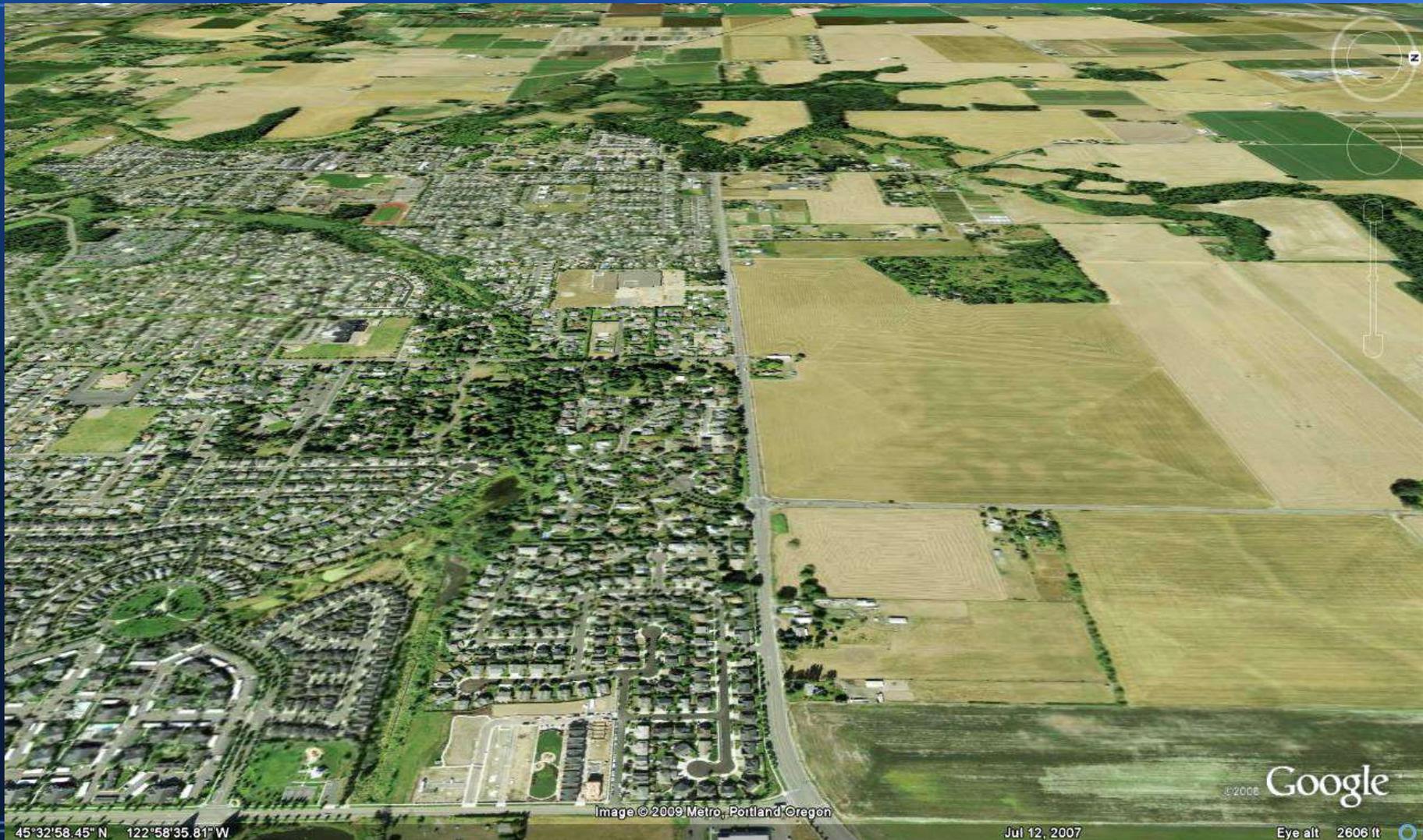
Alternative Approaches?

We think so.......

Zone-Based Impact Fees where remote locations pay more and core/interior locations pay less make sense – but will they actually work.

Average Cost vs. Structured

- Average Cost
  - Single zone
  - Cost not associated with location
  - No reduction in incentives to sprawl
- Variation Based on Infrastructure & Service Costs
  - Multiple zones
  - Each zone has a different fee rate
  - Fee structure incentivizes more compact development

Example

- Consider choice of location:

  - Saint John's County, FL (Jacksonville suburbs)

    - 1 zone
    - Single Fee: $9,686

  - Albuquerque, NM

    - 18 zones
    - Fee: From $1,370 to $9,480
    - Unique for each zone

Albuquerque

- Why implement a varying fee program?
  - Planned growth strategy:
    - "Encourage infill and redevelopment."
  - Efficient infrastructure utilization
    - Use existing infrastructure more intensively
    - Rehabilitiate/improve interior services

Albuquerque's Program

- Implemented in July of 2005
  - Zone-based program
  - Phased in over three stages
    - 33% of final rates until January 2006
    - 66% of final rates until January 2007
    - 100% of final rates thereafter
  - Housing crisis response
   - 50% fee reduction as of October 2009

Albuquerque Fee Zones

Impact Fee Structure

- Based on Home's Charachteristics (not price)
  - Drainage fees - based on lot size
  - Transportation, Recreation, Safety - based on sq.ft.
  - Three major aggregated zones
    - Based on historical growth patterns and accessability
    - Grouped into core, (northern) interior, and fringe

Impact Fee Structure

- Core Zone:
    - Maximum rate: $1,370
- Interior (Northern) Zone:
    - Maximum rate: $5,537
- Fringe Zone:
    - Maximum rate: $9,480 (with more variation)
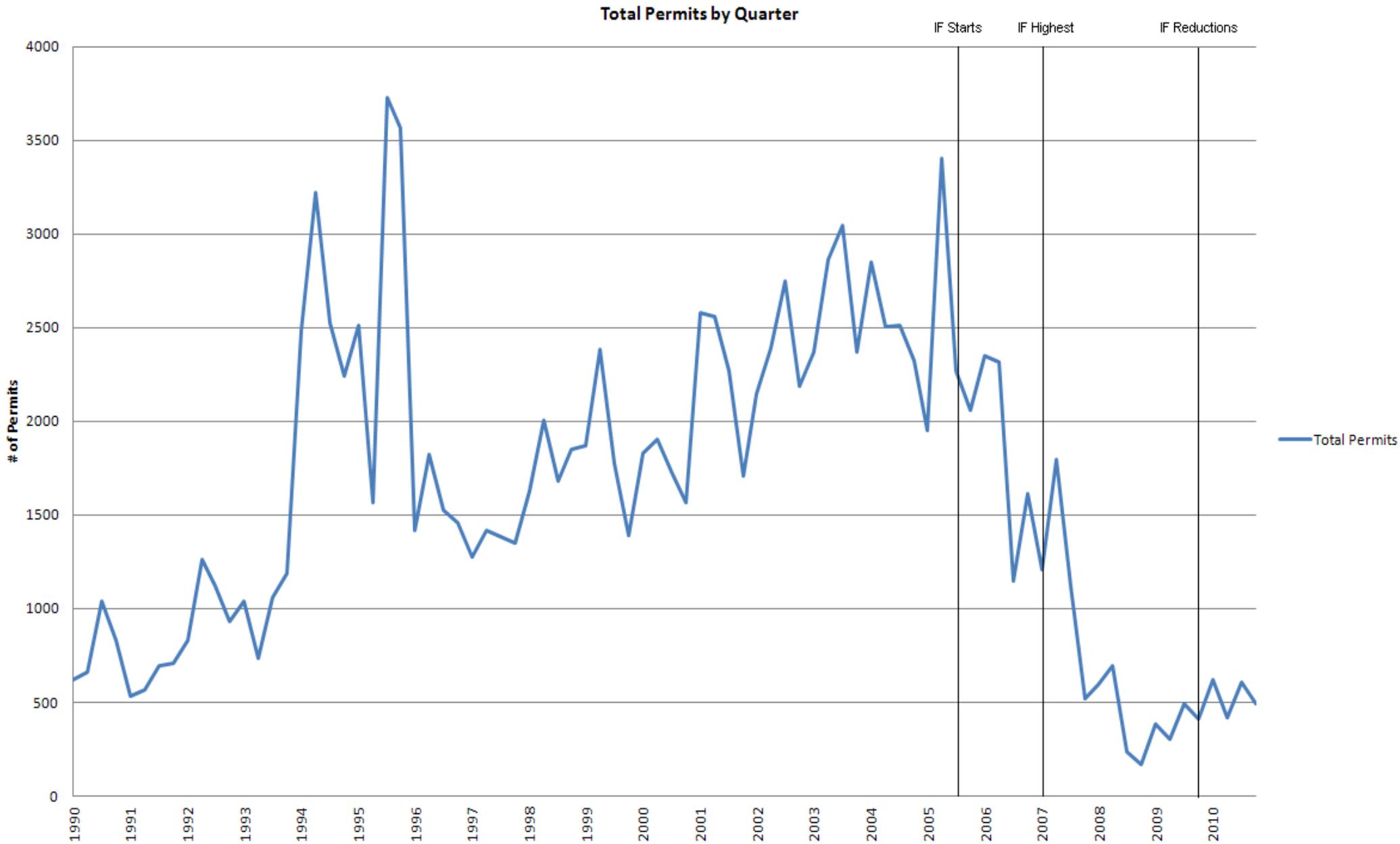
Zones and Permits
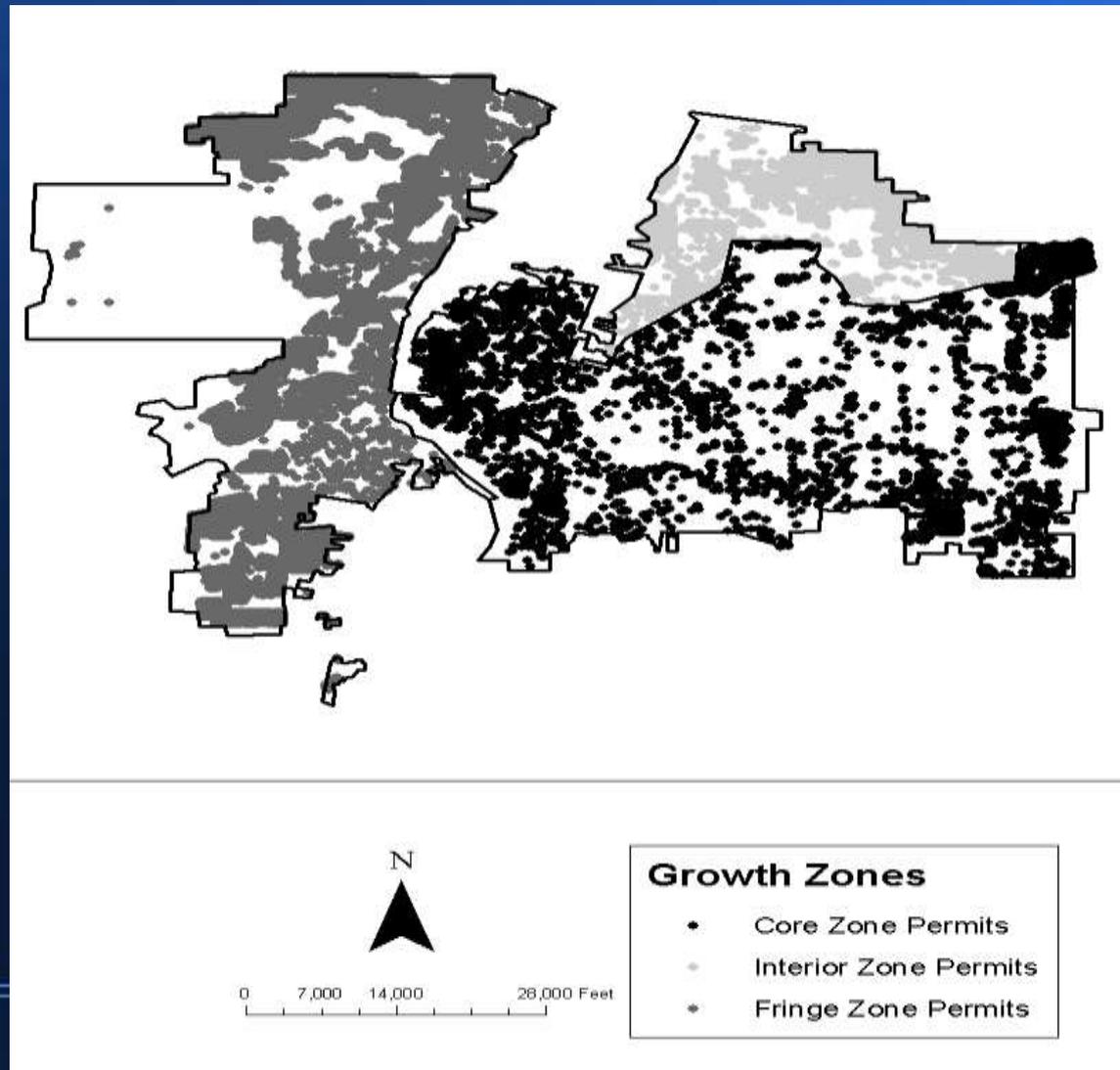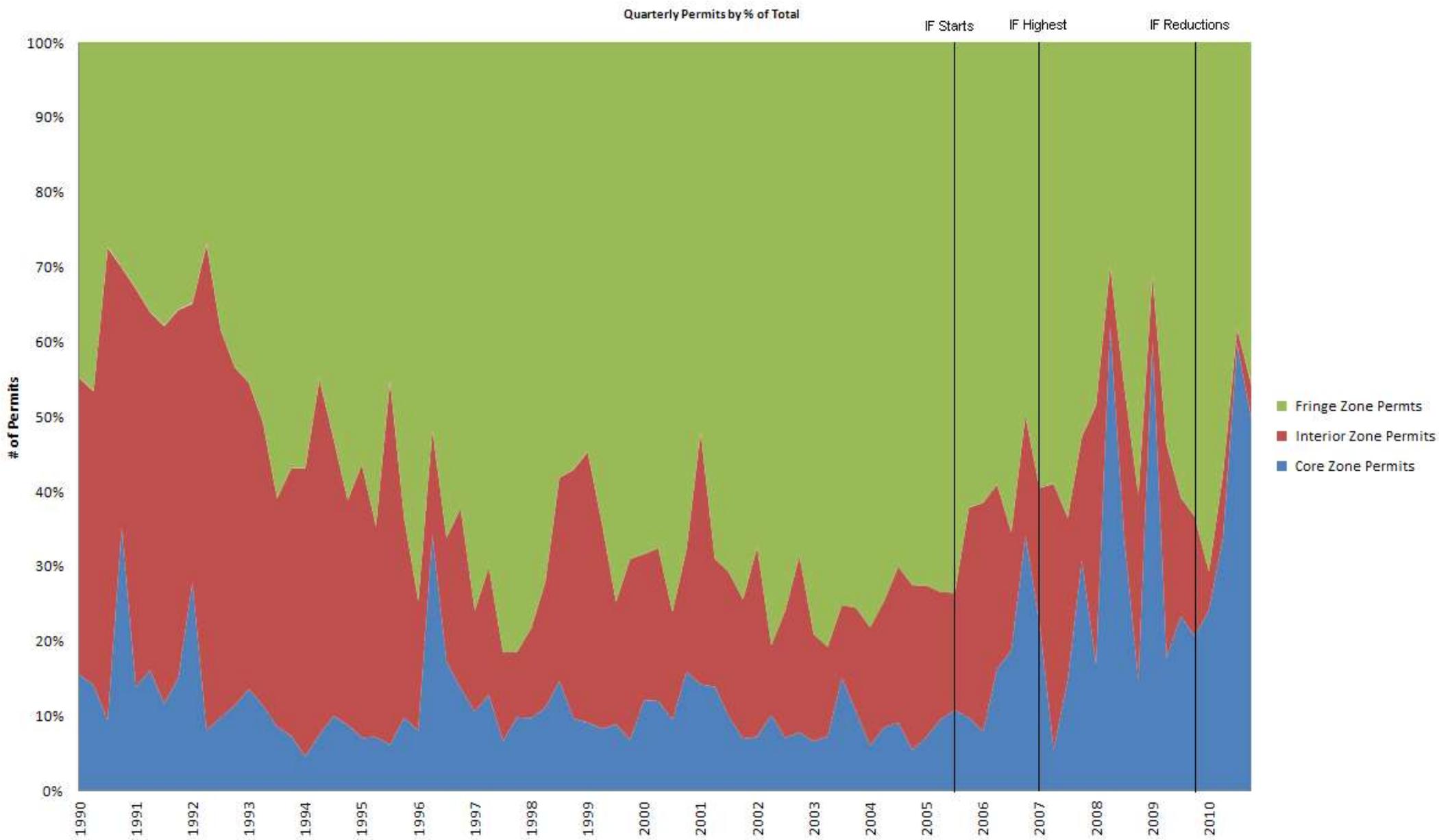
Albuquerque Residential Permits

- Building permits

    - 21 years of monthly data, 252 months
        - January 1990 – December 2010
        - 16 years prior to program, 5 following adoption

    - Average of 246 permits per month, with considerable variation!

Total Permits

Total Permits by Quarter

Visual Share of Permits by Zone

Quarterly Permits by % of Total

Regression Analysis

- Time Series Regression Analysis

$$P_{i,z} = F_{i,z} + C_i + \varepsilon_{i,z}$$

- $P_{i,z}$ = Permits issued in month i, for zone z

- $F_{i,z}$ = Impact fees charged in month i, for zone z

- C_i = Vector of control variables (house price index, interest rate, construction costs, unemployment rate, population, national permitting activties, recession?)

- $\varepsilon_{i,z}$ = Error term

Results From Level Analysis

- Effect on permitting per $ of impact fees
  - Larger negative effect in fringe
  - No effect in the northern interior zone
  - Small negative effect in core zone

- 12 to 1 Fringe/Core (compounding effect)
  - 6 to 1 ratio of impact fee size
  - 2 to 1 ratio of effect per dollar

- Lack of significance in intermediate zone (opportunity cost, close substitutes)

Table 4: Permits in Level

Variable	Newey-West OLS Regressions			SUR Regressions		
	Core Zone	Interior Zone	Fringe Zone	Core Zone	Interior Zone	Fringe Zone
if_core	**-0.014***			**-0.014***		
	(0.002)			(0.002)		
if_interior		0.000			0.000	
		(0.002)			(0.002)	
if_fringe			**-0.028***			**-0.028***
			(0.005)			(0.003)
vested_rights	2.961	-36.412	-9.857	2.961	**-36.412****	-9.857
	(4.200)	(28.813)	(32.864)	(3.797)	(15.415)	(24.386)
housing_crisis	**-3.627****	-7.313	-17.231	-3.627*	-7.313	-17.231
	(1.501)	(8.635)	(15.733)	(2.111)	(10.744)	(17.598)
interest_long [1]	0.986	-2.045	**-41.872***	0.986	-2.045	**-41.872***
	(1.194)	(4.908)	(13.289)	(1.001)	(3.972)	(7.288)
interest_short [1]	-0.258	3.288	-7.540	-0.258	3.288*	**-7.540****
	(0.548)	(3.055)	(5.373)	(0.476)	(1.792)	(2.827)
construction_PPI [2]	**0.365***	-0.224	1.242	**0.365***	-0.224	**1.242****
	(0.097)	(0.320)	(1.214)	(0.081)	(0.312)	(0.605)
unemployment [2]	**-4.345***	-2.430	**-39.894***	**-4.345***	-2.430	**-39.894***
	(0.612)	(3.198)	(6.878)	(0.555)	(2.316)	(3.365)
population [2]	-0.444	-0.274	2.078	-0.444	-0.274	2.078
	(0.451)	(1.681)	(2.450)	(0.468)	(1.198)	(1.466)
HPI [2]	0.410	**4.576****	**5.677***	**0.410****	**4.576***	**5.677***
	(0.310)	(1.771)	(2.071)	(0.235)	(0.892)	(1.401)
permits_national [3]	0.146*	-0.102	0.215	**0.146****	-0.102	0.215
	(0.074)	(0.201)	(0.352)	(0.075)	(0.271)	(0.487)
constant	-15.041	72.387	**533.594****	-15.041	72.387	**533.594****
	(21.283)	(81.878)	(265.208)	(17.933)	(71.344)	(133.371)
Observations	250	250	250	250	250	250
R-squared	0.48	0.44	0.72	0.48	0.44	0.72

Results from Share Analysis

- Assymetric effects remain

  - Core share turns insignificant

  - Intermediate share increases, fringe share decreases

- Does the core have available lots?

- Evidence local economic conditions influenced permits more than national recession trends.

Table 5: Permits by Share

| Variable	Newey-West OLS Regressions			SUR Regressions		
	Core Zone	Interior Zone	Fringe Zone	Core Zone	Interior Zone	Fringe Zone
if_core	-0.001			-0.001		
	(0.002)			(0.002)		
if_interior		**0.004*****			**0.004*****	
		(0.000)			(0.001)	
if_fringe			**-0.003*****			**-0.003*****
			(0.000)			(0.001)
vested_rights	1.281	0.029	-1.310	1.281	0.029	-1.310
	(2.105)	(2.570)	(2.639)	(2.669)	(3.679)	(3.582)
housing_crisis	2.758	**6.389*****	**-9.147*****	2.758	**6.389*****	**-9.147*****
	(3.330)	(2.490)	(3.411)	(2.403)	(1.563)	(2.586)
interest_long[1]	**3.459*****	**2.258****	**-5.717*****	**3.459*****	2.258	**-5.717*****
	(0.618)	(0.969)	(1.104)	(0.883)	(1.747)	(2.034)
interest_short[1]	-0.285	0.167	0.117	-0.285	0.167	0.117
	(0.191)	(1.094)	(0.532)	(0.304)	(1.094)	(1.210)
construction_PPI[2]	**0.206*****	**-0.620*****	**0.413*****	**0.206*****	**-0.620*****	**0.413*****
	(0.057)	(0.071)	(0.086)	(0.077)	(0.123)	(0.149)
unemployment[2]	0.382	**3.405*****	**-3.787*****	0.382	**3.405*****	**-3.787*****
	(0.381)	(0.542)	(0.635)	(0.550)	(0.898)	(1.051)
population[2]	**-0.411*****	0.090	0.321	**-0.411*****	0.090	0.321
	(0.160)	(0.387)	(0.395)	(0.169)	(0.569)	(0.675)
HPI[2]	-0.181	**0.652*****	**-0.470****	-0.181	0.652	-0.470
	(0.080)	(0.203)	(0.212)	(0.122)	(0.441)	(0.465)
permits_national[3]	0.007	-0.056	0.049	0.007	-0.056	0.049
	(0.043)	(0.064)	(0.075)	(0.036)	(0.051)	(0.064)
constant	**-44.987*****	**71.733*****	**73.254*****	**-44.987*****	**71.733****	**73.254****
	(12.106)	(16.483)	(19.206)	(15.612)	(30.049)	(34.540)
Observations	250	250	250	250	250	250
R-squared	0.32	0.64	0.62	0.32	0.64	0.62

Intermediary Conclusions

- Albuquerque's program mitigated sprawl by intensively discouraging growth near the urban fringe, growing the share of development in interior northern regions, and having no adverse effect on the share of growth in the core (although, no boost in levels of core growth)

Additional Considerations

- Did the missing fringe growth disappear or was it redirected?

  - Possibility for 'growth jumping'

  - Effects on nearby communities

- Rio Rancho

  - Only large immediately adjacent community

  - Started its own impact fee program about a year after Albuquerque's
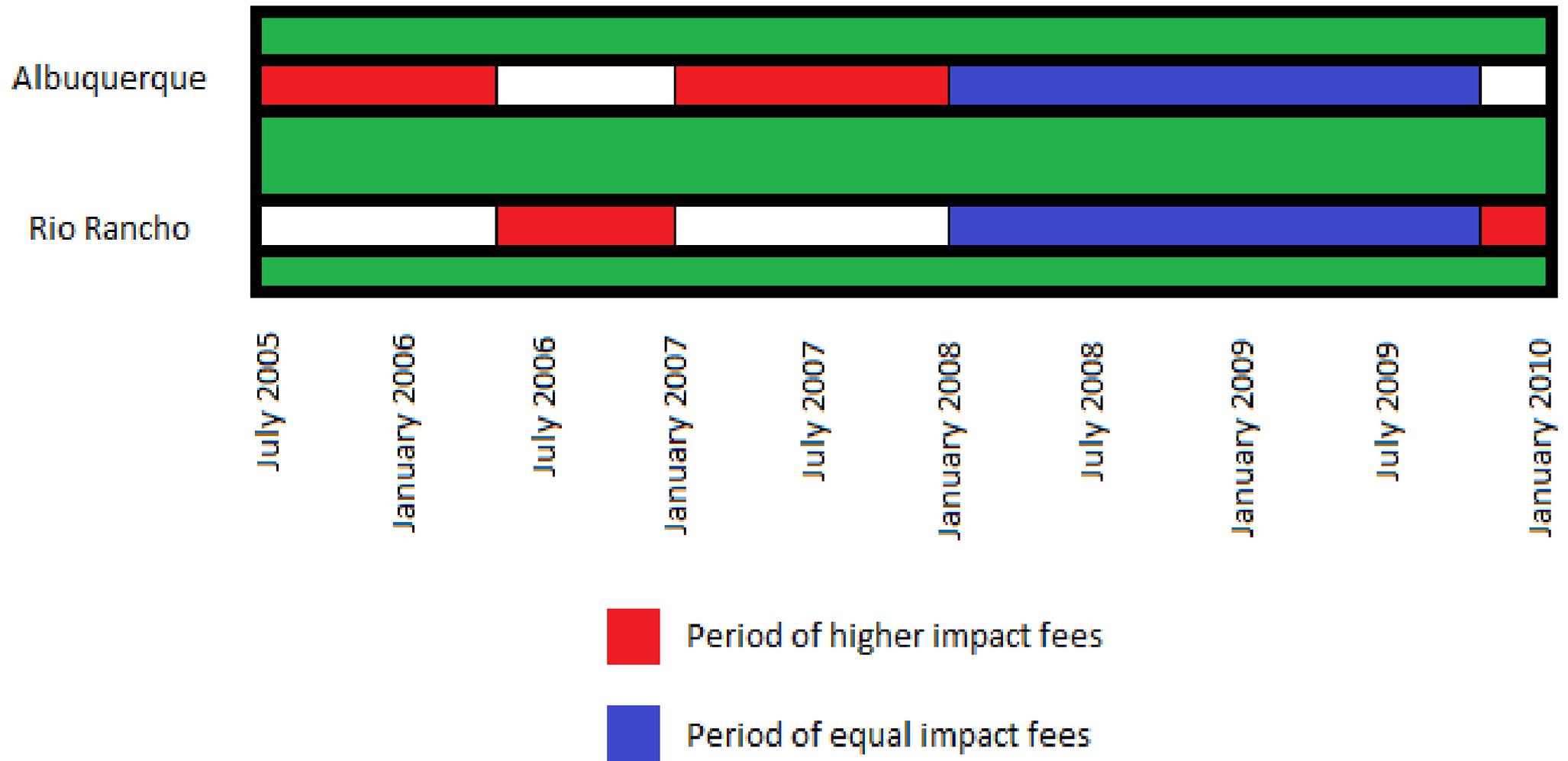
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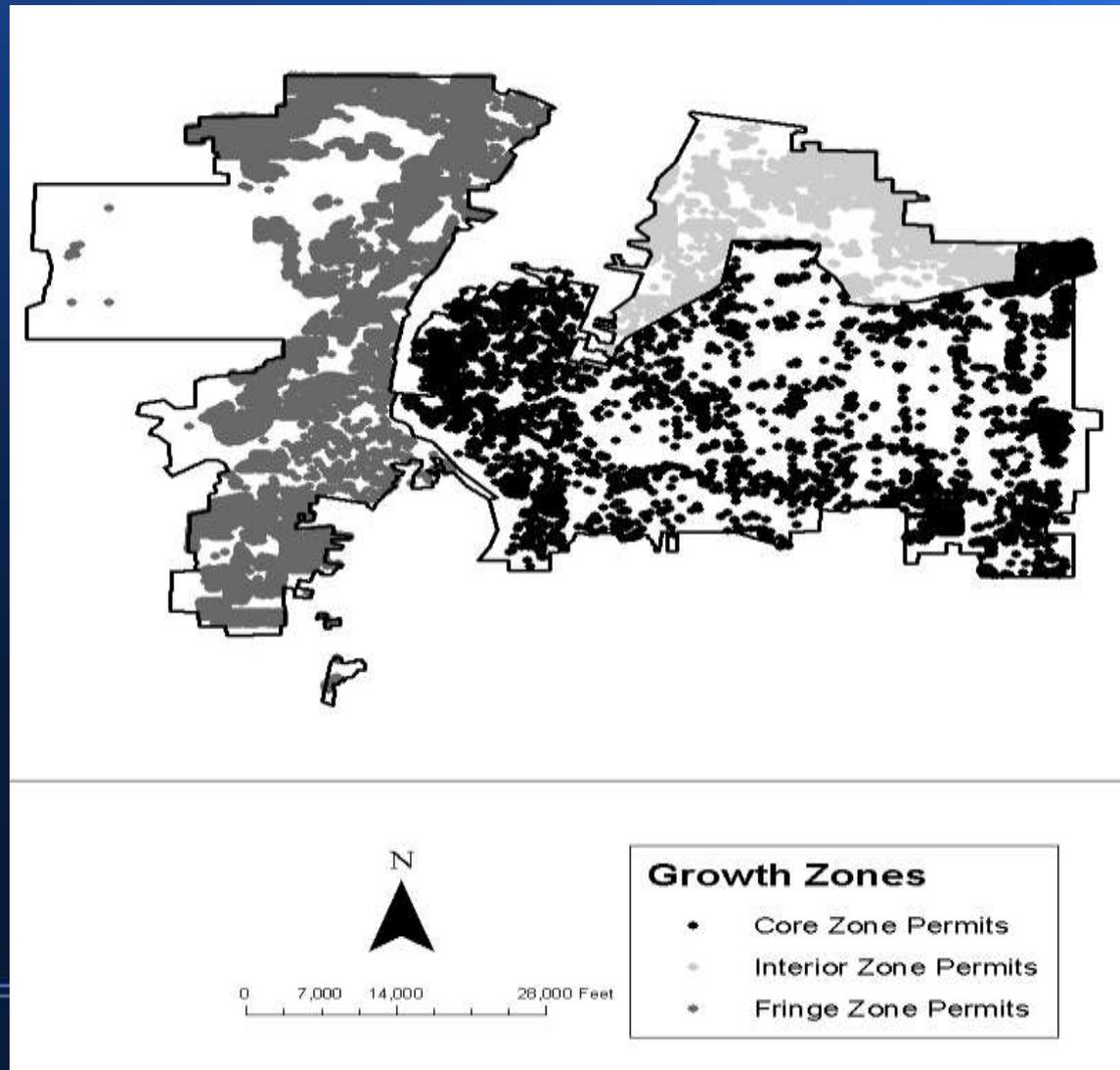
Rio Rancho vs. Albuquerque

- Rio Rancho:
    - Average-cost program
    - Started in May of 2006
        - Phased in until full cost in January 2008
    - Lowest fee at $8,038
    - Highest fee at $9,882

Impact Fee Period
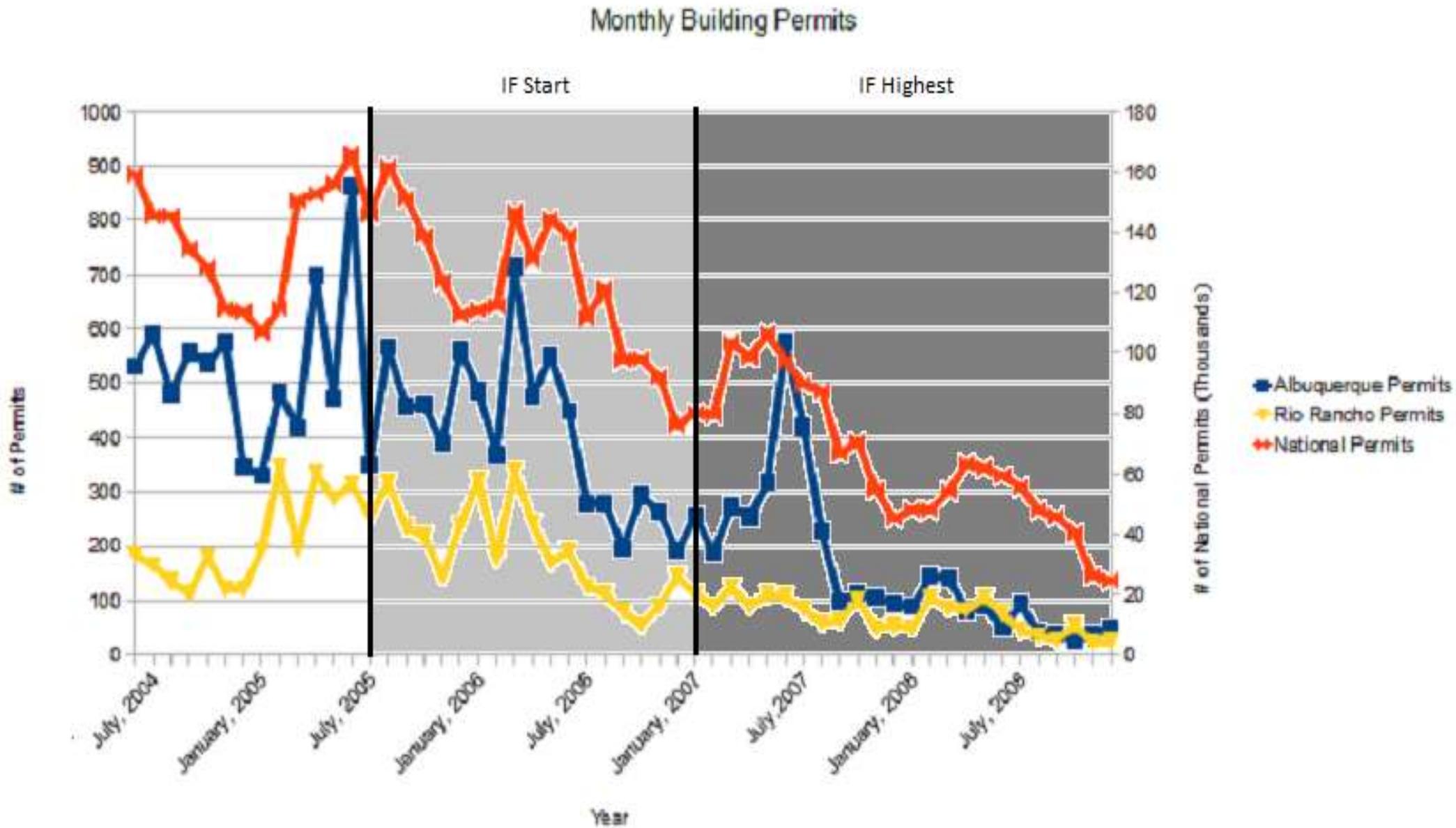
Table 7: Spillovers Test Using Rio Rancho

Variable	Newey-West OLS Regressions
alb_if_higher	**58.633****
	(29.493)
alb_if_lower	**-73.098****
	(31.197)
alb_rr_if_same	-12.295
	(33.150)
housing_crisis	-46.540*
	(27.754)
interest_long [1]	-1.881*
	(1.050)
interest_short [1]	**3.977***
	(1.505)
construction_PPI [2]	**0.821***
	(0.314)
rr_pop [2]	**218.762****
	(102.962)
HPI [2]	**5.676***
	(1.904)
permits_national [3]	0.348*
	(0.186)
constant	-229.760*
	(124.239)
Observations	252
R-squared	0.68

Rio Rancho Spillovers

- During the periods when the Albuquerque side of the border had higher fees, approximately *half* of the overall reduction in Albuquerque fringe permitting was redirected across the border into Rio Rancho. Spillovers were zero/insignificant when parity in impact fee rates on both sides of the shared border was present.

Conclusions

- The program did reduce permitting on average

- The use of structured system significantly influenced the geographic distribution of permit across the Albuquerque MSA

- Albuquerque's emphasis on pre-existing service provision levels (i.e., using existing infrastructure more intensivley) led to overall cost savings

- More efficient method of financing vs. Average Cost

Conclusions

- Evidence for mitigation of urban sprawl

- Growth jumping may occur

    - Regional programs or integrated programs

- Demonstrate the importance of infrastructure cost differentials when designing fee programs

- Validates Impact Fees as a Price-Based market driven alternative to urban growth boundaries as a policy tool.

THANK YOU

- Questions?
- Refinements?
- Future Directions?

- If interested – please see a more comprehensive discussion in our *JAPA* piece.